

Space News Roundup

Vol. 30

June 7, 1991

No. 23

SLS-1 investigations start on *Columbia*

The third countdown was the charm for *Columbia* as it launched at 8:25 a.m. CDT Wednesday for a trouble-free climb to orbit carrying the Spacelab Life Sciences-1 module.

Wednesday's launch was held for an hour and 24 minutes with T-9 minutes left to go in the countdown to wait for a break in low clouds above the Kennedy Space Center. Forecasters had given the launch only a 50-50 chance of acceptable weather conditions.

Columbia's crew — Commander

Bryan O'Connor, Pilot Sid Gutierrez, Mission Specialists Tammy Jernigan, Rhea Seddon and Jim Bagian, and Payload Specialists Millie Hughes-Fulford and Drew Gaffney — immediately began their work, and spent their first two days in space powering up the Spacelab and their medical equipment. Following that, operations on board *Columbia* are planned to reach a steady pace of constant daily medical checks and experiments.

STS-40 is the first flight dedicated totally to space medical investigations.

A total of 18 experiments — 10 of which will use crew members as subjects and are managed by JSC — complete the SLS-1 investigations.

Columbia is presently scheduled for landing at Edwards Air Force Base June 14.

Prior to launch Tuesday, pad inspectors noticed a small, four-inch square piece of insulation that had loosened on *Columbia's* external fuel tank. The foam insulation was subsequently reglued and posed no problems in the countdown.

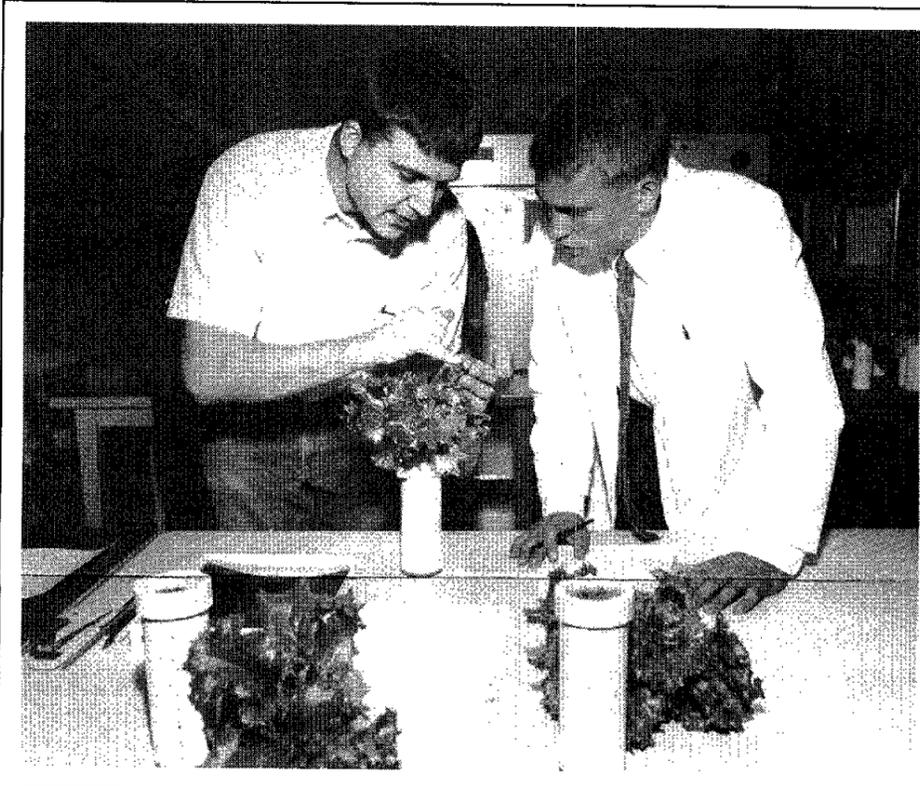
The second launch attempt by *Columbia* was thwarted early June 1 when one of the spacecraft's three inertial measurement units, instruments that provide the shuttle's navigational information, malfunctioned. The faulty IMU was replaced with a new unit for Wednesday's launch.

Elsewhere at Kennedy, preparations of *Atlantis* for a launch on STS-43 around July 25 and of *Discovery* for a Sept. 12 launch on STS-48 remain on schedule.

This week, *Atlantis'* main engines

were tested as were the spacecraft's orbital propulsion systems. On *Discovery*, the electricity-generating fuel cells were checked and work began to ready the payload bay for its next task, deployment of the Upper Atmospheric Research Satellite.

Endeavour, scheduled for a first launch in early April 1992, continues to undergo post-delivery checkouts in the Vehicle Assembly Building. *Endeavour* will become the first occupant of a third processing hangar scheduled to open at KSC in September.



JSC Photos by Benny Benavides
HARVEST TIME—Crew and Thermal Systems Division workers gather lettuce from the Regenerative Life Support Systems tested in Bldg. 7A. Left: Dr. Dan Barta, plant physiologist, and Brian Sauser, Lockheed, observe the plants that have been brought into one of the RLSS labs. Above: Dr. Don Henninger, RLSS chief scientist, pictured in the doorway, removes the first research crop from the fully automated plant growth chamber assisted by Dr. Doug Ming, soil mineralogist and Dr. Carolyn Clark, a Lockheed ecologist.

Truly: Freedom balances future space program

By Kari Fluegel

NASA Administrator Richard Truly Wednesday pledged to work with President George Bush and the Congress to make sure Space Station *Freedom* is a part of NASA's future.

Truly and Associate Administrator for Space Flight William Lenoir took a few minutes to meet with reporters at the Kennedy Space Center after the successful launch of STS-40.

During the recent weeks, Congress has discussed the Space Station *Freedom* project extensively. The House Appropriations Committee voted Monday to delete the space station funding request from the 1992 budget. A vote by the full house was expected Thursday.

"We've been actively pointing out that this issue is more than space station issue," Truly said. "It's a space program issue about America having a balanced space program."

"It's early in the Congressional season and I'm confident just as the Congress has supported NASA over the last 30 years or more that we'll continue to get that support."

The administrator said a chief concern is that cancellation of the space station would result in an unbalanced space program.

"Space Station has been in the American civil space program plans since the *Colliers* magazine articles of the early 1950s and before Alan Shepard and John Glenn ever flew the first flights," Truly said. "I think the setback of losing space station would totally disrupt all of NASA's planning."

The Space Station *Freedom* program has been surrounded by controversy, Truly said, but as NASA moves forward the project becomes more and more stable.

"We're in the kind of business in the space program where we draw a lot of interest, and whether we succeed or fail or stub our toe — even though we're a small agency in the budget sense — we draw the interest of (the media) and the American People," he said.

Lenoir said NASA has not spent enough time educating the country and Congress about the benefits of the space station program. When the agency did discuss such benefits, it focused on narrow discipline

Please see **TRULY**, Page 4

Reseachers tie impact crater to dinosaurs' demise

The first surface evidence of a buried impact crater formed by a comet or asteroid which may have caused the extinction of the dinosaurs, has been discovered by NASA researchers.

The scientists believe a ring of sink holes in the northwestern corner of the Mexican state of Yucatan outlines the largest known impact crater on Earth. The crater, which is more than 125 miles in diameter, is a prime candidate in the search for an impact that may have caused the planet-wide extinctions of dinosaurs and other species about 65 million years ago.

Charles Duller of NASA's Ames Research Center, Mountain View, Calif., discovered the ring formation in 1987 while searching satellite imagery for water sources used by ancient Mayan cities.

Two other members of the research team — Dr. Kevin Pope, formerly of Ames and now with Geo Eco Arc Research in La Canada, Calif. and Adriana Ocampo of NASA's Jet Propulsion Laboratory, Pasadena, Calif. — considered many other geological explanations before con-

cluding the formation was caused by a buried impact crater.

"The apparent age, location and size of the proposed Yucatan impact make it one of the best candidates for the global catastrophic event, although multiple impacts remain a possibility," Pope said. "Regardless, the Yucatan impact alone would have had a devastating impact on the climate, animals and plant life of the Earth."

Some scientists believe such an impact pushed so much dust and debris into the atmosphere that it blocked sunlight, interrupting the growth of plants, starving dinosaurs and other animals and freezing much of the Earth.

The team's findings agree with the work of other scientists who have found unusual circular gravity and magnetic patterns and quartz fractured by an impact, all suggesting a buried crater in the Yucatan.

The circular hydro-geological feature, which they named the Cenote Ring (cenote is the local Spanish name for sink holes), provides surface evidence of the buried crater's precise

location and size. It is centered near the town of Chicxulub, for which the buried crater is named.

Duller mapped hundreds of water-filled sink holes which form an almost perfect semicircle that marks the crater's buried rim. Fresh water springs well up beneath the surface where the Cenote Ring meets the shore line.

The sink holes are found in clusters at some places along the rim and spaced up to a mile apart at others. They average 300-500 feet in diameter.

"As the buried crater rim settles over millions of years, the rock on top slumps and cracks," Pope said. "Underground water flows through the cracks on its way to the ocean. As the water is forced around the unfractured rock in the center, the flow dissolves the limestone, causing cave-ins that create the sink holes."

Pope and Ocampo examined core sample data taken from nearby exploratory oil wells and found they geologically date the buried crater's floor at Late Cretaceous about 65 million years ago. The crater floor has younger Tertiary sediments on top.

Lounge leaves astronaut corps, joins SPACEHAB

Astronaut John M. "Mike" Lounge will leave NASA June 21 to become Director of Houston Operations for SPACEHAB, Inc.

"This is a very tough job to leave, but I feel that three flights is my fair share, and I'm ready for a new challenge," Lounge said.

"I remain completely dedicated to our long-term mission of the exploration and exploitation of Space. We are building the pyramids of our civilization, and it takes a huge team to get that done. I'm not leaving the team, I'm just changing positions."

SPACEHAB is providing a pressurized module to be flown in the orbiter's payload bay to augment NASA's ability to carry middeck

experiments. It will fly on a series of space shuttle flights beginning in late 1992.

Lounge currently is Chief of the Space Station Support Office in the Flight Crew Operations Directorate, dealing with Space Station design and operation. He was hired by JSC in 1978 as an engineer in the Payloads Operations Division and was selected as an astronaut candidate in 1980.

"For the past several years I have been working on design and operations concepts for the Space Station *Freedom*," he said. "When I made my decision to leave NASA several months ago, I thought the station program was finally in pretty good

shape and could look forward to a period of stability and real design progress. I'm sorry to see such a vital project become embroiled in politics. The station is a very important stone in this pyramid we are building."

"I'll always be inspired by the professionalism, the dedication, and the talent of the great NASA family."

Lounge has flown on three Shuttle missions: STS 51-I launched August 23, 1985; STS-26, September 29, 1988; and STS-35 December 2, 1990. During STS 51-I, Lounge deployed the Australian AUSSAT communications satellite and operated the Shuttle's robot arm while fellow crew members successfully repaired the SYNCOM IV-3 satellite.

Two other communications satellites were deployed on this mission. On STS-26, the first flight to be flown after the *Challenger* accident, the crew successfully deployed NASA's Tracking and Data Relay Satellite (TDRS-C). Lounge was flight engineer on STS-35, ASTRO-1, which was dedicated to astronomical research.

"Mike has made many significant contributions to this organization and to the space program during his tenure," said Donald R. Puddy, director of flight crew operations. "He will be missed by everyone. We wish him the best in his new position and look forward to working with him in this capacity."



Mike Lounge

JSC

Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Gift Store from 10 a.m.-2 p.m. weekdays.
 General Cinema (valid for one year): \$4.
 AMC Theater (valid until May 1992): \$3.75.
 Loews Theater (valid for one year): \$4.
 Astroworld (valid 1991 season): season, \$44.94; child less than 4-feet, \$10.12; one day, \$15.85; Waterworld, \$8.15.
 Seaworld of Texas (valid 1991 season): child (3-11), \$12.25; adults, \$17.25.
 Six Flags (valid until Nov. 17, 1991): one-day, 15.95; child less than 4-feet, 14.95; two-day, 20.95.

JSC

Gilruth Center News

Sign up policy—All classes and athletic activities are first come, first served. Sign up in person at the Gilruth Center and show a badge or EAA membership card. Classes tend to fill up four weeks in advance. For more information, call x30304.

Defensive driving—Course is offered from 8 a.m.-5 p.m., July 13, Aug. 10 or Sept. 21. Cost is \$15.

Aerobic dance—Eight-week session meets 5:15-6:15 p.m. Tuesday and Thursday nights. Cost is \$24.

Exercise class—Class meets 5:15-6:15 p.m. Monday and Wednesday nights. Cost is \$24.

Weight safety—Required course for employees wishing to use the Gilruth weight room. The next class will be from 8-9:30 p.m. June 20. Cost is \$5.

Ballroom dance—Beginning and intermediate ballroom dancing lessons will be offered for eight weeks. Cost is \$60 per couple.

Country and western dance—Six weeks of Monday night sessions begin June 17. Cost is \$20 per couple.

AIKIDO—Martial arts class meets Tuesdays for six weeks beginning June 26. Cost is \$30 per person.

Fiction Workshop—A six-week workshop will begin June 26. Cost is \$80 per person.

JSC

Technical Library News

The following selections are now available in JSC's Technical Library. Bldg. 45, Rm. 100.

Principles, Policies and Procedures: Domestic Geographic Names. Donald J. Orth; 1987. G105.077 1987.

Chemical Safety Data Guide. Bureau of National Affairs; 1985. KF1875 .C493 1985.

All Hands on UNIX Video Workshop. Concurrent Computer Corp., 1989. QA76.063 .A44 1989.

JSC

Swap Shop

Property

Sale: Camino South, 3-2-2A, corner, new roof, brick accent wall w/FPL, lg kitchen w/island, oak cabinets, ceramic tile, lg Saltillo tile patio w/trellises, jacuzzi, \$77K. x33335 or 326-2582.

Sale: Pipers Meadow, 3-2-5-2, formal LR/DR, FPL, loft, wet bar, fans, gar dr opener, deck, landscaped, new paint, \$98K. Dennis, x34405 or 480-5076.

Rent/Sale: Pipers Meadow, 3-2-2, \$850/mo or \$90K assum. 486-0610.

Sale: Bayfront lot on Todville, \$125K; two water view lots near NASA, \$38.5K ea. Don, x38039.

Sale: Egret Bay condo, 2-2-CP, all appl, waterfront, FPL, blinds, fan, patio, storage, pools, boat ramp, \$42.9K. x30092 or 481-3637.

Lease: El Dorado Trace condo, 2-2, FPL, W/D, wet bar, sec sys, pool, tennis, jacuzzi, avail June 15, \$525/mo. 333-8707 or 480-4525.

Sale/Lease: El Dorado Trace condo, 1-1-5-CP, all appl, patio, balcony, FPL, fans, designer wallpaper and carpets, assum wappi. Gladys, 326-2725 or Joyce, 286-1177.

Lease: CLC condo, 2-1, FPL, appl, vaulted ceilings, mini blinds, pools, storage, W/D conn, \$475/mo. x12175 or 486-0315.

Sale/Lease: Dickinson 2-1-1, 1800 sq ft, \$34K, \$372/mo, zero move in. 337-6404 or (409) 849-3791.

Rent: Baton Rouge, fum apt, near Bourbon St, \$75/wknd. Kay, 337-3122.

Rent: Friendswood area, enclosed RV storage stall, 40' deep, lights/pwr. 482-9396.

Sale: Friendswood custom 3-2-2D home, landscaped, decking and trees, atrium, FPL, whirlpool, \$85K. 482-2138.

Sale: Meadowgreen, 5-2-5-2, 2 story, 2 LR, FPL, cul de sac. 488-3191.

Sale: '71, 14' x 70', mobile home, 3-1-5, good cond, new paint/carpet, H w/w/d/A/C, \$5K OBO. x35000. 333-6806 or 484-4944.

Rent: Lake Travis cabin, private boat dock, CA/H, fully equip, accom 8, wkly/dly, \$425/\$85. 474-4922.

Rent: Arkansas Lake Cabin, wooded, 4 acres, screened porch, fum, \$250/wk, \$50/day, 338-2517.

Lease: Nassau Bay, 4-2-2, no pets, 2 living areas, newly reded, deck, 1.5 story, 2000 sq ft, \$890/mo. 333-6806 or 484-4944.

Lease: El Lago, 4-2-2, formal LR/DR, family rm, FPL, fenced yard, \$995/mo. Sylvia, 488-7363.

Sale: Nassau Bay Queen's Court townhome, 3-2-2A, 2-story, unique floorplan, new roof, wet bar, den, FPL. Vince, 282-3497 or 333-5598.

Sale: League City, 3-1-5-1, mini blinds, fan, fence, deck, ceramic floor, FPL, assume who approval, \$59.5K. 554-7727.

Sale: '90' waterfront lot, 3-2-2 rock lakehouse on Lake Placid near Sequin, incl 600 sq ft boat and fishing dock, \$95K. 488-7387.

Rent: LC, Pecan Forest, clean 3-2-2 w/FPL, no pets, \$795/mo. 554-6200.

Sale: Harbour Park, 4-2-5-2, 1.5 yr, both formals, FPL, jacuzzi, lg lot w/landscaping, assum FHA, \$139K. 334-1745.

Lease: Webster/Ellington, 2-1 condo, extras, W/D, \$460/mo. Dave, x38156 or Harb. 481-1253.

Rent: Galveston condo, fum, sleeps six, cable TV, swimming pools, wknd/wkly/daily rates. Magdi Yassa, x38470 or 486-0788.

Sale: Westwood Shores lot, trees, \$9.4K cash, or 25% down, 2nd mort at 10% on remainder or trade for van or PU of equal value. 554-6841.

Rent: 27 class C motorhome, sleeps 6, unlimited mi, fully loaded, incl microwave, must have insurance, \$800/wk. Tim, 481-0440.

Sale: Dickinson, 3-2-2, lg LR, kitchen, master BR, well maint, avail July, x38078 or 538-1217.

Cars & Trucks

'84 Nissan 300ZX, 2+2, auto, A/C, stereo, \$5650 or '80 Pontiac Phoenix, V6, auto, A/C, stereo, \$1950, sell one not both. x30092 or 481-3637.

'82 Olds, ex cond, 58K mi, \$2.2K. 485-3490.

'81 Ford van, E-150 club wagon, rebuilt eng/trans, capt chrs, dual A/C, \$2.7K. Arch, x37628 or 488-2124.

'84 Mitsubishi Cordia LS, eng overhaul, 2 dr, hatchbk, std, white w/gray trim, good cond, \$2K OBO. 996-6929.

'84 Olds Clera, new rebuilt eng, ex cond, 4 dr, 4 cyl, lt blue, A/C, auto, \$2.7K. 280-2192 or 480-6697.

'77 Dodge Ram Charger, 4WD, 1.8K. Greg, 283-1273 or 554-2504.

'81 VW PU diesel, fuel saver, ex cond, new tires. Bitsy x34834 or 946-6451.

'79 Olds Cutless Supreme, one owner, ex cond, moonroof, \$1250. Pam, 486-2150 or 488-3976.

'90 Sunbird SE, sunroof, tilt, AM/FM/cass, ex cond, \$9.2K OBO. Tammy, 280-2257 or (409) 825-1802.

'84 Camaro, pwr, A/C, IROC access, metallic gray, 65K mi, \$3.6K. Rogers, x38851 or 944-7042.

'85 Ford LTD Crown Victoria station wagon, 5.0L V-8, auto, P/S, P/B, A/C, P/W, P/L, cruise, tilt, stereo, \$3499 OBO. Jeff, 282-7744 or 996-1907.

'82 Ford Anaheim custom van, P/S, P/B, AM/FM/stereo, 4 capt chrs, sofa/bed, 2 A/C, 2 tanks, CB, cruise, tilt, BO. 488-3191.

'80 Honda Accord, 2 dr, gray, good cond, \$900. Paul, x31883 or 532-1516.

'78 Camaro, looks/runs good, \$1195. 333-6671 or 332-9105.

'87 Toyota Supra, white/blue, ex cond, 50K mi, top end stereo, \$11K. Tim, x34333 or 486-0534.

'90 Ford Tempo GL, auto, A/C, P/L, P/M, AM/FM/stereo cass, P/B, P/S, \$8.7K incl ex service policy. Bob, x30825 or 998-7372.

'79 Toyota, 4WD P/U, good eng/trans/mech, \$1.5K. Bob A., x34409 or 393-1670.

'74 Triumph TR6, runs, body good cond, \$3K. Sam Parker, x39723 or 486-5566.

'66 Mustang, 289 eng, 3 spd/std, 59K mi, ex cond, \$5.9K. 480-5090.

'83 Ford Country Squire SW, good cond, BO. Dan, 481-3056.

'87 Cadillac El Dorado, runs, new exhaust sys, \$350 OBO; '76 Mercedes 240D, rebuilt eng, new tires, auto, A/C, \$3.6K OBO. 480-4535.

'82 Dodge, 024, AM/FM/cass, new tires, std, good cond, \$1K. 337-5482.

'88 Mitsubishi Precis, 5 spd, A/C, AM/FM/cass, good cond, \$3.5K. 333-7070 or 482-2342.

'78 Chevy Nova, maroon, runs good, new brakes/tires, 3 spd column shift, \$1K. x32897.

'80 Chrysler Le Baron coupe, 6 cyl, 63K mi, some dents, no rust, good tires, \$900. x38869 or 488-1432.

'85 Jeep CJ-7, red w/black hard top and bikini top, 6 cyl, 5 spd, A/C, P/S, AM/FM/cass, 59K mi, \$6.5K. 470-0777.

'86 Mazda 929, loaded, sunroof, ex cond, \$10.5K. 244-9843 or 532-2215.

'77 Dodge Monaco, A/C, new brakes, reliable, \$600 OBO, will trade for boat and trlr. Gene, x38020 or 334-1505.

'86 Dodge D150, 318 V8, auto, A/C, P/S, P/B, AM/FM/cass, long bed, camper shell, \$5.5K. Matt, x34285 or 486-7260.

'83 VW GTI, black, A/C, sunroof, port Sony, roof rack, tires/al/brakes/muffler/CV joints replaced in last 10K mi, \$2.8K. Andy, x32503 or 334-2647.

'86 VW GTI, blk, 5 spd, A/C, sunroof, new brakes and tune up, AM/FM/CD, \$4.7K OBO. Scott, 282-3985 or 286-3922.

'86 Cutless Supreme Int, 2 dr sport coupe, 2.8 multiport fuel inj, all pwr, 45K mi, \$8.3K OBO. Kirk, 282-2911 or 332-5676.

'77 Ford Granada 600 mi, P/S, A/C, ex mech cond, body good, new tires, \$1K OBO. Bob, 488-3693.

'87 Dodge 600, auto, P/S, P/B, A/C, AM/FM, cruise, 8K org mi, \$6K. 992-5835.

'86 Toyota 4 Runner 4x4, ex cond, 4 cyl, FI, 5-spd ODO, 73K mi, \$7.5K OBO. Bob, 996-0393.

'83 Ford Fairmont, A/C, AM/FM, P/S, auto, runs, good parts car, will sell parts or car. Ed, 244-9844 or 559-1215.

'85 Renault Alliance, 2 dr, beige, A/C, good cond, runs great, \$1.5K. Ignacio, 282-4818 or 486-1078.

'80 Pontiac Bonneville, 150K mi, well used, \$500. Michael, x35559.

Cycles

Honda 450, \$250. Gil, 282-3314 or 334-1484.

'80 Yamaha 400 XS, ex cond, black, windshield/faring, \$800. Bob A., x34409 or 393-1670.

'87 Kawasaki KLR-650, multi-purpose, 6K mi, liquid cooled, elec start, ex cond, extras, \$1750. 282-3307 or 486-4016.

Earth Cruiser beach bicycle, soft seat, big tires, \$65. Karen, x35466 or 992-1076.

'86 Honda Nighthawk motor cycle, 6K mi, \$2K. Michael Berezinski, x35559.

'89 Ninja 600R, 7.5K mi, new rubber, rare, black/white factory paint, looks and runs good, \$2.8K. Randy, 282-4845 or 486-4940.

'84 Kawasaki GPZ 750, 8.5K mi, super clean, \$2K, OBO. Shannon, x32646 or 484-5412.

Boats & Planes

Mercury OB, mid and lower units, V150, 25" shaft, rebuilt, re-inged, both run well, \$3K/pwr or \$5.5K/pwr. 996-8326.

O'Brien Fressail sailboat, 12', 45lbs, 5.4 sail, stable, adjust centerbd, sail battens, gear bag, \$175. x32539 or 538-1649.

Evnrude, 25 hp, elec start, new, \$1.4K. Jerry Craig, 283-5311 or 420-2936.

Cl. boat slip w/roof, motorized boat hoist for pwr boats, \$125/mo. 474-4922.

'84 Mark Twain, 19', open bow, 200 hp, I/O Merc, good cond, \$4295. 488-9080 x3861.

'86 14' Grumman FB, 15hp, Sea King galv trlr, 4 seats, ex cond,

Today

Cafeteria menu—Special: fried chicken. Entrees: fried shrimp, baked fish, beef stroganoff. Soup: seafood gumbo. Vegetables: okra and tomatoes, buttered broccoli, carrots in cream sauce.

Council of Technical Societies—The Clear Lake Council of Technical Societies will hold its Eighth Annual Awards Banquet at 6:30 p.m. tonight at Gilruth Center. Guest speaker will be Dr. Carolyn Sumner, director of the Museum of Natural History, who will discuss "What's Up This Summer." For more information, contact Andy Lindberg at x31474.

Monday

Cafeteria menu—Special: meat sauce and spaghetti. Entrees: franks and sauerkraut, sweet and sour pork chop with fried rice, potato baked chicken. Soup: cream of potato. Vegetables: French beans, buttered squash, lima beans.

AIAA lunch and learn—A lunch and learn meeting of the American Institute of Aeronautics and Astronautics' international space activities committee will be 11:30 a.m. June 10 in Bldg. 3. Dr. Hideo Hasegawa, director of the NASDA Liaison Office, will speak on NASDA Space Operations in Japan and America.

Tuesday

Cafeteria menu—Special: smothered steak with dressing. Entrees: beef stew, liver and onions, shrimp Creole. Soup: navy bean. Vegetables: buttered corn, rice, cabbage, peas.

Wednesday

Cafeteria menu—Special: salmon croquette. Entrees: roast beef, baked perch, chicken pan pie. Soup: seafood gumbo. Vegetables: mustard greens, Italian green beans, sliced beets.

Astronomy seminar—The JSC Astronomy Seminar will be held at noon June 12 in Bldg. 31, Rm. 129. Dr. Norm Ness, Bartol Institute, will speak on Planetary Magnetism. For more information contact Al Jackson 333-7679.

Thursday

Cafeteria menu—Special: stuffed cabbage. Entrees: beef tacos, ham and lima beans. Soup: beef and barley. Vegetables: ranch beans, Brussels sprouts, cream style corn.

AIAA—The Houston Section of the American Institute of Aeronautics and Astronautics will hold its annual honors and awards banquet June 13 at Gilruth Center. A social hour will begin at 5:30 p.m., followed by dinner at 6:30 p.m. Cost is \$8 for members and spouses, \$9 for nonmembers and \$7 for students. For more information, contact John Trebes at x37215.

Friday

Cafeteria menu—Special: Salisbury steak. Entrees: fried shrimp, deviled crabs, ham steak. Soup: seafood gumbo. Vegetables: buttered carrots, green beans, June peas.

June 19

Astronomy seminar—The JSC Astronomy Seminar will be at noon June 19 in Bldg. 31, Rm. 129. Dr.

Rudolph Decker will speak on "Testing General Relativity in Space." For more information contact Al Jackson 333-7679.

June 21

Juneteenth celebration—The Black Programs Committee of JSC's Equal Opportunities Program will commemorate Juneteenth in the form of a traditional picnic at 4:30 p.m. June 21 at the Gilruth Center. Tickets are available from Pat Burke in the Equal Opportunity Programs Office in Bldg. 1, Rm. 172. Cost \$6 adults; \$3 children (8 and younger). For more information contact Freda Marks x30603.

June 25

BAPCO meets—The Bay Area PC Organization (BAPCO) will meet at 7:30 p.m. June 25 at the League City Bank and Trust. For more information contact Earl Rubenstein, x34807 or Tom Kelly, 996-5019.

June 26

Astronomy seminar—The JSC Astronomy Seminar will be at noon June 26 in Bldg. 31, Rm. 129. This will be an open discussion meeting. For more information contact Al Jackson 333-7679.

June 27

BANN meeting—The Bay Area NAFE (National Association of Female Executives) Network will meet at 6 p.m. June 27 at the South Shore Harbour Country Club. For more information Contact Wanda Spain 483-0125.

\$1.5K. 282-4869 or 487-0926.

'83 Renken 18' sailboat, roller furling jib, 4 hp aux, galv trlr, sleeps 4, good cond, \$4K. 339-3476.

'78 Johnson OB motor, 25 hp, elec start, short shaft, tiller steering, \$400. David, x39041 or 534-2247.

'84 Starwind, 27' sailboat, 3 sails, inbd diesel, well maint, extras, full instrumentation, roller furling, wheel steering, new bottom, low 20's. x37566 or 488-2434.

'81 21' Sleskcraft Jet boat, 425 Olds w/Berkeley jet drive, \$2K OBO. Bob, 996-0393.

'12' mahogany plywood boat, BO. Dave, 282-4519 or 486-5732.

'12' sailboat w/14' mast, 2 sails, trlr, \$450. David, 280-5326.

'18' ski boat 165 hp Mercuriser I/O, low hrs, \$3495. 333-5179. Loran, Stix/Koden, C navigator, \$175 OBO. 554-2728.

Rent: Beechcraft Debonair B33, 185 mph cruise, stormscope, 3 axis autopilot, extras, \$70/plyr. Bryan, 282-4384 or (409)740-7610.

Audiobook & Computers

A B Dick model 970z copier, ex cond, \$300. Shawno, 3-1786.

IBM XT computer, ex cond, 640K RAM, 30 MB HD, 2 FD, color monitor, \$975. x36290.

Dual FD laptop, \$350; B/W video camera, \$50; Analog RGB monitor (640x200), \$25; 12" composite video monitor w/audio, \$60; 13" EGA/CGA monitor, \$250. David, 282-3972 or 488-4207.

Software, educational, word scramble, play and learn, age 7-11, for IBM X clones, full pkg w/manual, \$25. Youm, 283-4813.

Series FX 90 truck speakers, new, 8" woofer and tweeter, \$65. Denise, 282-6674 or 925-4025.

Tascam M1B line mixer, \$175; invisible synth stand, \$65; road case 4 space rack, \$75. Richard, x37764 or 480-7050.

XT clone computer, 20 MB HD, dual 360K FD, multifunction card, color/RGB/CGA, printer, \$700. Bob, x34409 or 393-1670.

Infinity Quantum JF speakers, 12" 3 way, \$400 OBO. 997-2069.

800K internal disk drive for MAC II, ex cond, \$150. Sunil, 283-4329 or 480-4270.

Advent Legacy floor standing loudspeakers, were \$800, now \$200. Trey, x36759 or 992-1076.

Macintosh w/spreadsheet, word processor SW, all documentation, \$200. Glenn, 280-8580.

Compact port computer, 640K, 8MB, 2 360K FD, 2400

Sparking awareness

Planning ahead key to JSC's fire, accident prevention practices

By Billie Deason

When a fire engine clangs its way to a JSC building, many may wonder if it is a real fire or just a false alarm?

Fortunately, most are not actual fires but are demonstrations of JSC's strong fire and accident prevention practices at work — practices that make JSC's accident and fire statistics compare quite favorably with those of surrounding area industrial sites.

"Most situations are inadvertent alarms rather than actual fires," said Gary Jones, supervisor of fire protection for Webb Murray. "The majority of fire alarms come in through the automatic monitoring systems in each facility."

Webb Murray and Associates serves as the 24-hour liaison between JSC and the Houston Fire Department. Through a formal memorandum of understanding, JSC provides the fire station facility and equipment, and HFD provides personnel staffing.

The inadvertent alarms generally result from work or construction activities inside the building, Jones said.

"All kinds of work processes can generate lots of dust and smoke sensors sometimes 'see' that dust as smoke and send in the alarm," he said. "When we arrive at the scene of the alarm, the Webb Murray fire specialist checks out the building's alarm panel and investigates the overall situation. If we determine there is a fire inside the facility, Webb Murray turns it over to the senior officer of the Houston Fire Department on the scene, then it's HFD's fire scene. Webb Murray then is in place as a liaison to assist with anything HFD needs."

The fire inspection team tries to classify each alarm to better understand its causes. Such classification helps determine if there are several false alarms in one area due to a faulty detector, maintenance, construction or user activities.

"Classifying the alarm cause allows us to stack that information up against our prevention and inspection programs to make sure we're covering every possible area," Jones said.

The 20 separate categories include detector, wiring or panel malfunction; facility user, maintenance personnel or construction; weather; smoke but no fire; and actual fire.

"We treat all alarms seriously, however, we are pretty fortunate to have so few actual fires," he said. "Alarms can be as minor as smoke from an air handler motor or dust stirred up from

pulling cables in the ceiling or below the floor. However, all alarms can be a potentially hazardous situation."

In 1990, the JSC fire department responded to 244 fire alarms and made 86 ambulance runs.

Pre-fire planning aids firefighters by providing critical information about the facility and its contents. According to Jones, a pre-fire plan is developed for each facility with details about types of fire detection and suppression hardware, location of important components of those systems, hazardous materials in the building, special hazards, a building map, and where the fire department stages its equipment and personnel.

"Our pre-fire planning is now evolving to the point that we will be able to quickly identify any chemicals stored in a building," he said. "Using the new hazardous materials inventory data base, we're presently devising a format to break up the chemical listings into a room-by-room package for each building. That information exists right now in a bulk listing, but getting the important facts out real-time is more difficult."

In the recent fire in the printed circuit board laboratory of Bldg. 9, firefighters knew there were about 150 different chemicals in the room, but needed to determine if water could be used on them. The fire department obtained the information from the building's users, but it would be more efficient to have it available on the scene, Jones said.

"When we update our pre-fire plans this year, we plan to integrate the chemical listing," he added.

Jones said JSC actually is quite advanced in pre-fire planning. The City of Houston Fire Departments currently survey commercial buildings as an initial step in pre-fire plans for office and shopping complexes, he said. All JSC's pre-fire plans are revised annually.

Fire drills, another part of the overall fire protection program, are scheduled once a year for each facility occupied by employees. According to Jones, the primary reasons for the annual drills are to make sure workers know how to leave the building in an orderly manner and to allow the fire specialists to ensure the fire alarm bells can be heard throughout the facility.

"If the building has been modified or walls have been moved since the last fire drill, sometimes all the occupants cannot adequately hear the bells," Jones said.

Another phase of fire prevention is the addition of sprinkler systems in several JSC buildings. Historically, computer rooms and other hazardous areas have had sprinklers. Older facilities had the fire suppression system added while newer buildings, such as Bldg. 46 and the Space Station Control Center, included sprinklers in the original design.

"Our goal, from the SR&QA side of the house, is that all the important or critical areas would be protected by automatic sprinklers," said Richard Holzapfel, Chief of the Test Operations and Institutional Safety Branch.

"Of course, human safety is our biggest concern, but property protection is a major responsibility, too. Many critical functions reside within JSC's buildings. It doesn't take a whole lot of fire in a single room to get a lot of smoke damage throughout the facility."

"We realize, with budget limitations, we can't attain that goal immediately, so we work with the Center Operations Directorate to retrofit at least a couple of facilities each year."

Automatic sprinkler systems have already been installed in Bldgs. 1, 45 and 37. Plans are in place to add sprinklers to Bldgs. 31, 4, 8, 16, 7 and the administration wing of Bldg. 30, then all remaining two-story buildings.

Two more fire protection projects are scheduled to begin in about six months. The first effort will replace the fire and security central station equipment in the Bldg. 25 central station with the latest electronic notification system.

With the new system, the dispatcher will have a color graphic display of the building or area where the alarm is originating. Screens holding additional information are available in the system, and all pertinent details can be called up with a few keystrokes, replacing the cumbersome reference books required by the old setup. To complete the project, the dispatch functions will be consolidated into the Bldg. 30 command post area.

The second project will complete the replacement of antiquated fire alarm panels. A 1985 fire alarm panel replacement project concentrated on the center's critical buildings.

Fire prevention and control is but one facet of an aggressive safety program at JSC. The safety program is split between test safety and institutional safety. Numerous courses are offered regularly with most classes held at the JSC Safety Learning Center in Bldg. 226N. A monthly newsletter, "Safety Training," dis-

tributed to all JSC organizations, gives details and schedule information.

"Safety education is an essential element of JSC's safety goals," Holzapfel said. "We know that fire and accident prevention training help save lives, prevent injuries and conserve the Center's resources."

"We take an aggressive approach to safety training, especially with the number of construction contractors currently working on-site. These folks are motivated to get the job done as soon as possible to satisfy their contracts. Sometimes, safety can take a back seat to getting the job done, so we strongly emphasize safety measures with the construction programs."

"Additionally, we encourage our in-house contractors and service contractors to participate in our safety education program."

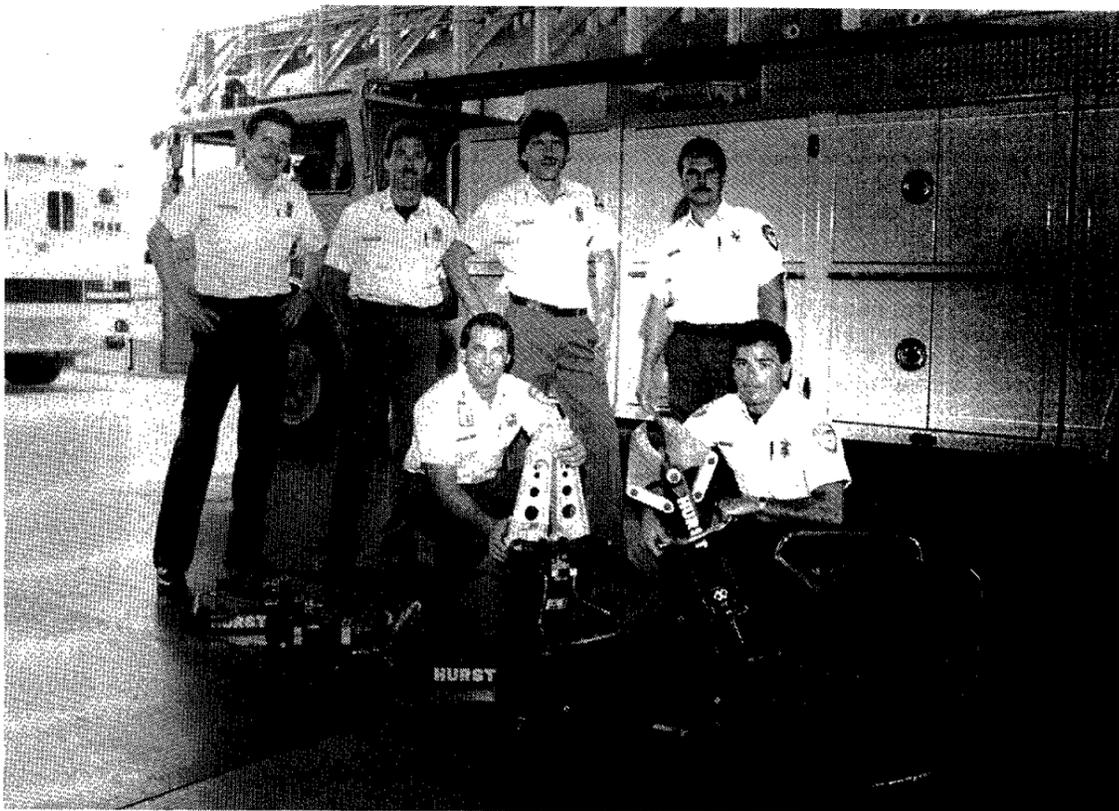
The HFD station personnel at JSC provides fire, ambulance and emergency rescue services. A new ambulance recently entered service at Station 72, outfitted exactly like other City of Houston ambulances. When personnel from other fire stations transfer to Station 72 or for work vacation relief, the identical equipment eases the transition. The old ambulance was refurbished for use by the Kelsey-Seybold on-site clinic.

"If needed, the Kelsey-Seybold ambulance would be called in to supplement the Station 72 ambulance," Jones said.

A complete set of emergency rescue equipment called Hurst tools — including what is known as the Jaws of Life — was purchased with the ambulance for use when accidents trap vehicle passengers in automobiles or workers in buildings. An electrical power generator, heavy-duty cutters, a power spreader and a set of three hydraulic rams provide the most up-to-date hardware for emergency rescue.

"Because of the size of the equipment, we carry the Jaws of Life equipment on the fire department ladder truck," Jones said. "In Houston, ambulances are on call more often than ladder trucks, therefore the Hurst tools stay in service more. Also the department normally dispatches a fire truck to an accident scene for additional manpower and in case the extrication equipment is needed."

Although the new ambulance, fire engine and ladder truck primarily serve JSC needs, Station 72 has mutual-aid agreements in place to assist nearby fire departments and ambulance services and provides service in Clear Lake City.



Above: Members of the Station 72 B-shift check out JSC's new Hurst rescue tools used to free trapped individuals. Nathan Jilek, kneeling left, holds the Jaws of Life and David Hearne, kneeling right, holds a cutter. Standing, from left to right, are Glen Rust, Michael McGinty, Mike Zigal and Gerard Taylor. All are members of the Houston Fire Department. Left: Station 72, located at the corner of Second Street and Avenue C is the home of JSC's emergency fire and rescue equipment and teams.

JSC Photos by Benny Benevides

Leave bank created to welcome reservists home

Operation Desert Storm called approximately 12,000 federal government employees to active duty from their jobs, and now, with the conflict in the Middle East over, those individuals are returning to civilian lives.

To help them readapt, the federal government has created a leave bank program that will distribute donated annual leave to the returning reservists, many of whom depleted their own leave accounts when called to active duty.

"Some federal employees took a

big hit," said Natalie Saiz, JSC's reservist leave bank program coordinator in the Human Resources Office. "Most of the reservists took their annual leave up front. Then they took military time and then went on leave without pay."

Depending on their rank and personal situation, the military pay that reservists receive when called to duty was generally about half of their normal salaries, Saiz said.

Federal employees may donate to the bank their accrued annual leave at a minimum rate of one

hour and a maximum rate of one-half the leave a person is allowed to accrue in a year or one-half their leave balance at the time of a donation, whichever is less. Contributions can not be specified for any individual.

Open season for donations began Monday and continues through July 13. In the first week, JSC employees already have donated more than 300 hours.

Saiz said all leave donated throughout the federal government will be pooled and then distributed

equally among all federal government employee reservists. Distribution is not based on need and may be used in the same manner that annual leave is used. The leave is expected to be distributed by October.

JSC had 13 employees called to active duty, Saiz said. Seven have returned, while six are still on active duty, she said.

Saiz added that the reservists leave bank program does not affect JSC's existing leave transfer program. The leave bank program has

a specified open season while JSC's leave transfer program is ongoing and is designed for employee's experiencing medical emergencies. Thus, JSC leave recipients are still receiving the donations they need.

Those wishing to donate leave must complete the form on JSC announcement No. 91-85 and return it to the Human Resources Office, mail code AH73. For more information, contact Saiz in the Human Resources Office at x33035.

Endeavour fund to help teachers

NASA Administrator Richard Truly recently announced the creation of the NASA *Endeavour* Teacher Fellowship Program that will award scholarship to undergraduates studying to be teachers.

The fund was established with gifts donated to NASA by the public for construction of the newest space shuttle orbiter.

Truly said the generous and heartfelt contributions — sent as a tribute to and a show of support for the space program — will be invested in America's future.

"As it worked out, Congress provided full funding for *Endeavour*, and therefore, I wish to announce our plan to use this money to establish the *Endeavour* Teacher Fellowship Program," he said.

Truly also said the program, targeted for implementation in fiscal year 1993, will support undergraduate students in teaching careers in elementary education, mathematics, science or technology.

"Each time *Endeavour* flies, people who have given to this fund should take pride in the fact that they not only helped to provide this magnificent flying machine but also provided society with some of its most vital resources — future scientists, engineers and technologists, backed up by a population literate in these subjects," he said.



JSC Photo by Bill Blunck

FREE THROW—Harvey Hartman, director of Human Resources, shoots some hoops in the Gilruth Center's new 175-by-105 foot gymnasium following ribbon cutting ceremonies last week. Hartman and others present at the ribbon cutting ceremony took advantage of the new gymnasium's hardwood floor. The gym unofficially opened for business May 22 and is designed primarily for basketball and volleyball, but will be used for other activities as well.

Ames-Dryden study investigates engine-only landings

A massive hydraulic failure disables the flight controls of an airplane miles from the nearest airport.

A crash landing may seem inevitable but an engineering study at NASA's Ames-Dryden Flight Research Facility shows that multi-engine aircraft with specially programmed flight control systems can touch down safely using just the engines to turn and land.

NASA's study resulted from several recent incidents in which the hydraulic control systems on large aircraft failed during flight. The pilots were left with little or no capability to land normally — using the aircraft's ailerons, rudder and elevators.

Engineers are doing the work on a simulator programmed to look at the engine-only handling and flying qualities of a variety of aircraft, including

large transports and a twin-engine jet fighter.

According to Frank W. Burcham, Chief of Ames-Dryden's Propulsion and Performance Branch and the study's initiator, the next major step will be to modify the digital flight control system in NASA's F-15 research aircraft for proof-of-concept flights. The flight program, to be done in cooperation with the U.S. Air Force, could take place within the next 18 to 24 months, pending formal approval.

The system tested at Ames-Dryden is solely for research, and not intended for operational use on existing aircraft. Data from current and future phases of the studies will be available to the aircraft industry for possible application to commercial and military planes.

Disastrous flight control system fail-

ures are rare in commercial aviation, said Burcham, "but if you can save just one aircraft every 10 years, the system is worth it."

Burcham explained that the augmented flight control system on a disabled aircraft would take the pilot's stick inputs and convert them into engine throttle commands. The flight control system would automatically program the engines to turn the aircraft, climb and descend, and eventually land safely by varying the speed of the engines individually or collectively.

In the Ames-Dryden study, the engineer-pilot research team used the simulator to compare handling and control characteristics of a four-engine jet transport and the NASA F-15. They "flew" the aircraft in both the augmented mode and with manual engine control using hand throttles.

The comparative study showed both types of aircraft can be controlled somewhat by manual engine control during level flight and benign maneuvers, but they are extremely difficult to land. In the augmented mode, safe flight and landings are possible even in air turbulence and crosswinds.

Preliminary flight evaluations by NASA pilots in the F-15 and in two business-size aircraft (a twin jet and a twin propeller) verified simulator predictions that some control is possible using just the hand throttles. But landing tasks are extremely difficult unless the flight control system has been tailored for engine control.

The engine-control idea is limited to multi-engine aircraft with electronic engine and flight control systems. It can be applied to either jet or propeller-driven aircraft.

NASA prepares aero-space plane component test

The National Aero-Space Plane Program is taking another step forward as NASA prepares to test a structural component made of advanced carbon-carbon composite material.

The NASP mission profile demands much greater performance from its structures and materials than does the Space Shuttle, which travels through the atmosphere in a relatively short time. Engineers expect that the NASP, also called the X-30, will experience structural loads at extreme temperatures and sustained high temperatures in high-altitude cruise through the atmosphere.

Design and fabrication of this flight-weight component follows years of technology development. The carbon-carbon material is stronger than metal at high temperatures. It's also lighter than aluminum, making it a good alternative in areas where active cooling can be avoided.

The component is part of a full-scale wing control surface from a generic

NASA aerospace plane design. The structure was shipped to NASA's Ames-Dryden Flight Research Facility in May for extensive tests this Fall. The flap-like component first will be tested for its ability to withstand mechanical loads similar to those on a vehicle that takes off from a runway like an airliner and flies into orbit.

Thermal trials are scheduled to start in Fall 1992. Initial tests will be limited to state-of-the-art strain measurement capabilities — about 600 degrees Fahrenheit. Researchers hope to achieve test temperatures exceeding 2,000 degrees by 1993.

The Missile Division of LTV Corp., Grand Prairie, Texas, designed and built the NASP test component under contract to NASA's Langley Research Center, Hampton, Va. LTV's successful fabrication of the somewhat stiff composite represents a major milestone in materials technology development.

"The fabrication was challenging,"

said Dr. Wayne Sawyer of Langley's Structural Mechanics Division. "It is a big part that requires a series of fairly high-temperature thermal cycles in the fabrication process. These thermal cycles result in material deformations in some way or another. It shrinks and expands and tends to warp. Just being able to make a big part or several big parts that will fit together is very tough and requires good control of the tolerances and the fabrication process."

The rib-stiffened NASP component is about 56 inches long, 39 inches wide, 14 inches thick at the leading edge and 6 inches thick at the trailing edge. It is patterned after part of a flight control surface called an elevon, which is mounted at the back of some aircraft and the Space Shuttle orbiter to provide pitch and roll control.

"To our knowledge the component is made of some of the most complicated carbon-carbon parts ever fabricated," said Langley's Dr. Don Rummler, also of the Structural Mechanics Division.

MCC viewing hours set for STS-40

The Mission Control Center viewing room will be open to JSC and contractor badged employees and their families during portions of STS-40.

Employees will be allowed to visit from 11:30 a.m. to 2 p.m. and

from 5 to 7 p.m. today; 1 to 5 p.m. Saturday; 1 to 5 p.m. Sunday; 11:30 a.m. to 2 p.m. Monday; 11:30 a.m. to 2 p.m. and 5 to 7 p.m. Tuesday; 11:30 a.m. to 2 p.m. Wednesday; and 11:30 a.m. to 2 p.m. and 5 to 7 p.m. Thursday.

Truly speaks out for station

(Continued from Page 1)
specific activities.

"We did not spend enough time talking about the larger, global benefits: the benefits to education, the motivation factor for the youth of America that will help us 10 and 20 years from now, the effect on the United States economy, our global competitiveness, keeping our aerospace industry as one of the major exporters that fills out its balance of trade numbers with black ink and not with red ink, and keeping the United States in leadership world-

wide in forging international partnerships," he said.

Truly also said the Spacelab Life Sciences-1 experiments flying on STS-40 are the precursors to life science project to be conducted to Space Station *Freedom*.

The launch of STS-40 is the 16th since STS-51L. Those 16 flights have been accomplished in 32 months which averages one every other month, Truly said.

"I think that should be a source of pride for everybody associated with the shuttle program," he said.

Patent holders honored

Sixteen new patents for innovations from the minds of JSC inventors found their way onto the books in 1990.

The 21 individuals holding those patents were recognized for their efforts Tuesday at the annual JSC Inventors Luncheon at Gilruth Center.

All the inventors were presented with plaques depicting the first pages of their patents.

Leo G. Monford, who designed a Docking Alignment System, Patent No. 4,890,918, was honored as inventor of the year.

Other patent holders recognized and their inventions were Franklin Chang-Diaz, Method of Hybrid Plume Plasma Propulsion; Jon B. Kahn, Docking System for Spacecraft; Robert L. Shuler Jr., Real-time Garbage Collection for List Processing Using Restructured Cells for Increased Reference Counter Size; Paul T. Baffes, Method of Up-front Load Balancing for Local Memory Parallel Processors; William D. Harwell and Mitchell B. Wu, Magnetic Attachment Mechanism; Joseph J. Kosmo and Frederic S. Dawn, Hazards Protection for Spacesuits and Spacecraft; and William E. Thornton Jr., who had two patents, Valve for Waste Collection and Storage, and Method for Waste Collection and Storage.

Also recognized were Brian G. Morris, Tank Gauging Apparatus and Method; Jane T. Malin and Bryan D. Basham, Discrete Event Simulation Tool for Analysis of Qualitative Models of Continuous Processing System; Benny R. Sprague, Quick Connect Coupling; Eric C. Dimpault-Darcy and Bobby J. Bragg, Thermal Switch Disc for Short Circuit Protection of Batteries; Richard L. Sinderson and George A. Salazar, Adaptive Data Acquisition Multiplexing System and Method; Richard J. Bozeman Jr., Vibration Analyzer; and Clifford W. Hess and Larry C.H. Li, Method and Apparatus for Positioning a Robotic End Effector.